

ADIANTUM IN NICARAGUA

Frank C. Seymour¹

In preparing this article, much help has been derived from Miss Edith Scamman's treatment of the "Maidenhair Ferns of Costa Rica". In addition to the text, her drawings portray characters not otherwise shows. Since that article was published, much collecting has been accomplished in Nicaragua and in other parts of Central America. It seems appropriate therefore to bring the subject up to date and to include not only Nicaragua but all of Central America to prepare the way for the discovery in Nicaragua of species not yet known there.

Descriptions of some of these species are difficult to find and specimens of some are scarce or difficult of access. To make information more readily available is the purpose of writing.

The first part of this treatment is an analytical key for all the species known to occur in Central America. It is followed by an alphabetic list of the same species with further information. Such synonymy is given as it has been necessary to deal with. In addition to a bibliography and index at the end, numerous references are given to assist the reader to pursue the subject further if desired. So far as I have been able to ascertain from specimens examined, 19 of the 34 species in Central America occur in Nicaragua.

I express my thanks to the following persons and their staffs for the privilege of examining specimens and using the facilities of their respective herbaria. Dr. Reed C. Rollins, Director of the Gray herbarium. Dr. Richard A. Howard, Director of the Arnold Arboretum. Dr. David B. Lellinger, Pteridologist of the United States National Herbarium. Dr. Daniel B. Ward, Director of the Herbarium of the University of Florida. Dr. Humberto Tapia B., Director of the Herbarium of the Escuela Nacional de Agricultura y Ganaderia of Nicaragua. Dr. H. W. Vogelmann, Director of the Pringle Herbarium

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References to publications from which much help has been derived.

- Shimek, Bohumil. The Ferns of Nicaragua, Bull. State Univ. Iowa 4:20 plates. 1896.
 Maxon, W. R. The Flora of Porto Rico and the Virgin Islands 6:419-425. 1926.
 Scamman, Edith. Maidenhair Ferns (*Adiantum*) of Costa Rica, Contr. Gray Herb. 187:1-22. 1960.
 Lasser, Tobias. Flora of Venezuela 1(2):727-749, t. 143-152. 1969.

ARTIFICIAL KEY TO SPECIES OF ADIANTUM
 known to occur in Central America.

Unless otherwise stated, segments mean largest segments.

- A. Frond entire, heart-shaped; sori long; fronds tufted 7. *A. cordatum* Maxon
 A. Frond variously divided into segments B.
 B. Frond without central axis, variously branched; segments 6 mm wide, 12-18 mm long 19. *A. patens* Willd.
 B. Frond with central axis, pinnately branched or unbranched C.
 C. Segments on stalks; stalks, at least some of them, 2-43 mm long, thread-like D.
 D. Sterile segments 5-6.5 cm wide, 6-8 cm long, sharply toothed; fertile segments 1.5-2 cm wide, 3.5-4.5 cm long; longest stalks 9-43 mm long 27. *A. Seemannii* Hk.
 D. Sterile and fertile segments 4-17 mm wide, 3-6.5 cm long; longest stalks 2-6(-12) mm long E.
 E. Frond simply (once) pinnate F.
 F. Sterile segments sharply serrate, each vein ending in a tooth; junction of stalk with segment sharply marked 9. *A. deflectens* Mart.

Letter G not used in the key.

- F. Sterile segments lobed or cut, not sharply toothed; junction with stalk not sharply marked 16. A. lunulatum Burm.
- E. Frond twice or thrice pinnate or more divided H.
- H. Sterile segments entire or cut or lobed, not toothed I.
- I. Stalks of segments densely hairy; frond climbing; main axis zigzag; axis of pinnae joining main axis at right angle 10. A. Feei Moore
- I. Stalks of segments glabrous; frond not climbing; main axis straight; axes of pinnae joining main axis at oblique angle; sori roundish to kidney-shaped J.
- J. Lower segments borne near base of pinnae, overlapping main axis; segments bluntly lobed 6. A. concinnum H. & B.
- J. Lower segments not borne near base of pinnae, not overlapping main axis; sterile segments entire or cut or lobed, not toothed K.
- K. Segments white at base where joined to stalk, narrowly wedge-shaped at base L.
- L. Segments 4-6 mm wide; rootstock long; segments lobed 2. A. andicola Liebm.
- L. Segments (widest ones) 8-17 mm wide 1. A. amplum Presl
- K. Segments not white at base where joined to stalk, widely wedge-shaped at base M.
- M. Joint of stalk with segment not clearly marked; segments sometimes falling leaving stalk on frond, not lobed . . . 23. A. Poirerii Wikstr.
- M. Joint of stalk with segment clearly marked by line; segments falling from stalk, slightly lobed 24. A. princeps Moore
- H. Sterile segments serrate N.
- N. Sori usually not borne near tip of segments; larger segments acute or acuminate, twice as long as wide, attached to stalk at end O.
- O. Dark color of stalk stopping abruptly at base of segment; larger segments abruptly acutely tipped; longest stalks 5-8 mm long; stipes glabrous, black, polished; frond quadripinnate 33. A. trapeziforme L.
- O. Dark color of stalk passing into base of segment; larger segments tapering at tip 5. A. caryotideum Christ
- N. Sori borne at rounded tip and sides of segments; segments regularly lobed; larger segments 1-2 times as long as wide, attached to stalk at end or base P.

- P. Each vein ending in a sinus; segments green beneath, 8-16 mm wide; stalks whitish, base of segments not whitish 26. A. Raddianum Presl
- P. Each vein ending in a tooth or not in a sinus Q.
- Q. Dark color of stalk passing into base of segment; rootstock long; segments not falling from stalks 4. A. Capillus-Veneris L.
- Q. Dark color of stalk stopping abruptly at base of segment; blade 3-5-pinnate R.
- R. Segments jointed to stalks, falling, with commonly 5 narrow lobes; sterile margins dentate 29. A. tenerum Sw.
- R. Segments not jointed to stalks, widely rounded with few wide lobes 3. A. Braunii Mett.
- D. Segments sessile or stalks no more than 1(-2) mm long, usually not thread-like S.
- S. Stalk attached to segments at wedge-shaped base; sori roundish or kidney-shaped; segments borne above and down to base of pinnae, overlapping axis; stalks 1-2 mm long 6. A. concinnum Willd.
- S. Stalk, if any, attached at side of oblong segment; sori various; segments usually not overlapping axis T.
- T. Sori few, 1-5, long, continuous or slightly interrupted U.
- U. Blades once pinnate; sori on both upper and lower margins of segments V.
- V. Pinnae closely sessile or stalks 1 mm long, 4-6(-8) pairs; lower sterile pinnae 5 cm wide, opposite ones frequently overlapping; axis glabrous; veins free; largest fertile pinnae 3-4(-5) cm wide 17. A. macrophyllum Sw.
- V. Pinnae on short stalks; stalks as much as 2 mm long; axis hairy W.
- W. Pinnae 6-10 pairs, alternate, the lowest 1.2-2.5 cm wide, 7.5-10 cm long; sterile margin sharply serrate, teeth erect; stipe and axis tomentose, with long hairs also; veins free or rejoining (anastomosing) 15. A. lucidum Sw.
- W. Pinnae 2-6 pairs, opposite, 2.5-5 cm wide, 10-15 cm long; axis hairy; veins forking and rejoining (anastomosing) 36. A. Wilsonii (Hk.) Baker
- U. Blade twice pinnate near base, at least lowest pinnae pinnate; main axis scaly or hairy or both; sterile margin toothed X.
- X. Sorus 1, long, on upper margin, rarely a

- X. Sorus 1, long, on upper margin, rarely a shorter sorus also on outer margin; pinnae 25-30 mm wide; segments 3-5 mm wide, 8-19 mm long; segments nearest long terminal segment less than 1/2 as long as longest segment; axis scaly-hairy; sterile segments toothed 25. A. pulverulentum L.
- X. Sori more than 1 on upper and lower or outer margins of segments Y.
- Y. Sori on lower margin of segments; segments 10-20 pairs, denticulate-serrate, with long reddish hairs beneath; axis densely scaly 13. A. Killipii Maxon & Weath.
- Y. Sori on outer (or seemingly lower) margin of gradually acuminate segments; pinnae 26-50 mm wide; segments (pinnules) 7-10(-12) mm wide, 2-4 cm long; sterile segments coarsely toothed; segments nearest terminal segment reduced, about 1/2 to 2/3 as long as longest segment 34. A. villosum L.
- T. Sori often several, short or interrupted, round or kidney-shaped or oblong; sori various Z.
- Z. Sori on both upper and lower margins of segments; pinnae alternate, lowest ones 2.5-5 cm long; segments usually whitened beneath; largest 3-6.5 cm long except in
- A. serrato-dentatum a.
- a. Segments with long reddish hairs beneath; rootstock nodulose; stipes clustered; see above 13. A. Killipii Maxon & Weath.
- a. Segments glabrous or usually becoming so; rootstock slender, long-creeping; axis usually scaly-hairy, sometimes becoming glabrous b.
- b. Frond bipinnate; midvein of segments distinct; largest segments (2-)3-4(-5) cm long; sterile margins evenly serrate; stipes distant; rootstock long, 1.8-2.5 mm thick, with loose filiform scales; segments whitened beneath; cp. p. 4 14. A. latifolium Lam.
- b. Frond once pinnate; midvein of segments none or obscure; rootstock short, stout, about 1 cm thick c.
- c. Sterile margin evenly toothed; longest segments (2.5-)4-6 cm long, whitened beneath; stipes distant 21. A. petiolatum Desv.
- c. Sterile margin unevenly double-toothed; longest segments 5-6.5 cm long, not whitened beneath; stipes clustered 18. A. obliquum Willd.
- Z. Sori on upper and sometimes outer margins, not on lower margin; veins not rejoining d.

- Z. Sori on upper and sometimes outer margins, not on lower margin; veins not rejoining d.
- d. Lower pinnae divided and subdivided; frond tripinnate or more divided with at least 2 segment-bearing branches; segments lobed at least shallowly; sori much interrupted e.
- e. Segments shallowly lobed, toothed, not notched; sori at tips of lobes 35. A. Wilesianum Hk.
- e. Segments deeply incised-lobed, about 7-lobed on upper margin; larger lobes notched; sori in notches; blade 4-5-pinnate 20. A. pectinatum Kunze
- d. Lower pinnae once divided, with only 1 segment-bearing axis; frond bipinnate; pinnules not divided f.
- f. Largest segments 4-17 mm long; midvein none or indistinct; sterile segments finely toothed on upper margin g.
- g. Stipe and axis conspicuously shaggy with many spreading filiform scales; segments toothed on upper margin; rootstock 4-7 mm thick
. 8. A. decoratum Maxon & Weath.
- g. Stipe glabrous, black, lustrous, or puberulent to short-scaly h.
- h. Axis glabrous or puberulent to short-scaly; longest segments 4-5 mm wide, 15-17 mm long; stipes clustered . 28. A. serrato-dentatum Willd.
- h. Axis with long spreading hairs; longest segments 10-14 mm long 30. A. terminatum Willd.
- f. Largest segments 2-4.5 cm long i.
- i. Axes of pinnae puberulent; segments opposite
. 12. A. Kalbreyeri C. Chr.
- i. Axes of pinnae scaly or hairy, sometimes both, not puberulent; segments alternate j.
- j. Rootstock short-creeping; stipes clustered k.
- k. Segments obtuse, abruptly narrowed at tip; sori short, kidney-shaped, on upper margin only, not on tip 11. A. fructuosum Sprengel
- k. Segments gradually narrowed to acuminate tip; sori long, curved, on upper and lower (or outer) margins near tip 34. A. villosum L.
- j. Rootstock long-creeping; stipes distant l.
- l. Segments nearest terminal segment less than 1/2 as long as longest segment; sterile tips of segments acute or acuminate, turned upward; segments not whitened beneath; sterile ones coarsely serrate; midvein indistinct or none; rootstock 5-8 mm thick, nodose 31. A. tetraphyllum Willd.

1. Segments nearest terminal segment 1/2 as long as longest segment; midvein distinct; rootstock 2 mm thick; segments whitened beneath; sterile segments denticulate; cp. p. 3
 14. A. latifolium Lam.

ANNOTATED LIST OF SPECIES

1. A. amplum Presl, Rel. Haenk. 1:63. 1825.
 Blade decomposed, 1-1.5 m long, puberulent beneath.
 Mexico (GH), Guatemala (GH), Salvador (GH).
2. A. andicola Liebm., Vid. Selsk. Skr. V. 1:266 (seors 114). 1849. A. Cooperi Baker, Journ. Bot. 25:25. 1887.
A. palmense Christ, Bull. Soc. Bot. Geneve II, 1:230. 1909, a synonym according to Tryon, Contr. Gray Herb. 187:22. 1960.
 Mexico (US), Guatemala (GH, US), Honduras (GH, US), Salvador (GH, US), Costa Rica (GH, US), Panama (GH, US).
 Nicaragua, San Rafael del Norte, alt. 1200-1350 m, pine woods, Miller & Griscom 154 & 158 (US).
 5 km N of Sta. Maria de Ostuma, WMW 23941 (US).
3. A. Braunii Mett., Kuhn, Linnaea 3675. 1869.
 Guatemala (US), Costa Rica (GH, US).
 Nicaragua, without definite locality, Garnier 1907 (GH).
4. A. Capillus-Veneris L., Sp. Pl. 2:1096. 1753.
 Mexico (FLAS, US), Fla. (FLAS), SE U. S. (FLAS), Guatemala (FLAS, GH, US), Costa Rica (GH), Miss. (FLAS), Panama (GH), Jamaica (FLAS). Type: linn 1252. 9.
5. A. caryotideum Christ, Bull. Soc. Bot. Geneve II, 1:230, fig. 1909.
 Guatemala (US), Costa Rica, Panama (US).
6. A. concinnum (H. & B.) Willd., Sp. Pl. 5:451. 1810.
 Type: Venezuela, Caracas, Humboldt & Bonpland (Herb. Willd. 20099 (B)). British Honduras (US), Guatemala (FLAS, GH, US), Honduras (GH, US), Salvador (GH, US), Costa Rica (FLAS, GH, US), Panama (GH, US), Cuba (FLAS), Venezuela.
 Nicaragua, all collections from the west except Mosquito Coast and Castillo.
 Jinotepe, Dept. Carazo, alt. 500 m, Hitchcock, s.n. (US).
 S. of Jinotega, alt. 1200 m, WMW 23550 (US).
 Jinotepe, Alt. 3200 ft., Howard 97 (US).
 Mosquito Coast, Schramm (GH); 1924 (US).
 Between Casa Colorada and Las Nubes, Porter 1207 (GH).
 Without definite locality, Garnier 1428 (GH), 1413 (GH), 4563 (GH), A1213 (GH), 1415 (GH).
 Ometepe, Dept. Rivas, Fournier; Hemsley; Shimek
 Casa Colorada, Dept. Carazo?, 850 m, MHV 7380 (US);
 Seymour 543 (VT).

Plan Grande, Dept. Nueva Segovia, Seymour 5132 (SEY).
Ocotal, Dept. Nueva Segovia, Hamblett 790 (ENAG, BM,
MICH, WIS).

Matagalpa, Seymour 2157 (VT).

Casa Colorada, Dept. Carazo, Seymour 543 (VT).

Rio Las Nubes, alt. 650 m, Garnier (GH); MHV 7467 (US).
Granada, Fournier; MHV 7590 (US).

Volcan Mombacho, Dept. Granada, Dudgey & Moore 1967
(F, MO, UC, NY, WDP, MICH); Atwood 3903 (B); Robbins
6254 (ENAG, SEY, SMU, BM, GH); Seymour 6100 (FLAS).
Masaya, Hitchcock s. n. (US); Zelaya 148 (ENAG, SEY, SMU,
F, MO, UC, NY, WDP, GH, WIS, MICH); Atwood 3288
(B).

Apoyeque, Dept. Managua, Marshall & Neill 6701 (ENAG,
SEY, MO).

La Concepcion, Dept. Managua, Nichols 914 (SEY).

El Crucero, Dept. Managua, Seymour 1402 (ENAG, SEY,
SMU, GH, F, MO, UC, NY, WDP, WIS, MICH).

Sta. Teresa, Dept. Carazo, Hamblett 1296 (VT).

Laguna de Masaya, alt. 300 m, Maxon 7750 (US).

Castillo, Dept. Rio San Juan, Shimek; Atwood 5171 (SEY,
BM).

Santiago Volcano, Dept. Masaya, 300-480 m, Maxon 7710
(US).

Sangsangta, Segovia District, Schramm 5 (US).

Sangsangta District, Schramm 37 (US).

Ameya, Dept. Chinandega, MHV 7137 (US).

7. A. cordatum Maxon, Amer. Journ. Bot. 19:165-166. 1932.
Type: Pittier 4297 (US); isotype (GH). Panama (GH, US).

8. A. decoratum Maxon & Weath. ex Maxon, Amer. Journ.
Bot. 19:165. 1932. British Honduras (US), Guatemala (FLAS,
GH, US), Honduras (GH, US), Costa Rica (GH, US), Panama (GH,
US).

Nicaragua, region of Braggman's Bluff, Dept. Zelaya, Engle-
sing 219 (US).

Montana Esquipulas, Dept. Zelaya, Shank & Molina 4702 (US).

9. A. deflectens Mart., Ic. Crypt. Brazil. 94. 1834.
Type: Brazil, Santarem, prov. Para, Martius. A. dolabriforme
Hk., Ic. Pl. t. 191. 1837. Guatemala (US), Honduras (US),
Costa Rica (FLAS, US), Panama (US), Colombia (FLAS).

10. A. Feei Moore, in Fée, Mem. Foug. 7:29, t. 24, f. 1.
1857. Isotype: Guatemala, Salvin, Vera Paz (GH).
A. flexuosum Hk., 2 Cent. Ferns, t. 61. 1861.
Guatemala (US).

11. A. fructuosum Sprengel, Syst. Veget. 4:113. 1827.
Similar to A. tetraphyllum and sometimes (Ind. Fil. 27. 1906)
treated as a var. of it. Scamman, p. 12, clearly states the dif

treated as a var. of it. Scamman, p. 12, clearly states the differences as given in my key, p. 6. Mexico to Panama, to Peru and Brazil; West Indies; as given by Scamman.

12. A. Kalbreyeri C. Chr., Ind. Fil. 28. 1906.

Type: Colombia, Kalbreyer 956 (K); photo (GH).

A. orosiense Christ, Fedde Repert. 8:17. 1910; according to Tryon, Contr. Gray Herb. 187:22. 1960. For description and illustration, see Copeland, Tropical American Ferns 303, pl. 62. 1941. Costa Rica (US), Panama (US), Colombia.

13. A. Killipii Maxon & Weath. ex Maxon, Amer. Journ. Bot. 19:166-167. 1932. Panama (GH, US), Trinidad, Guiana.

14. A. latifolium Lam., Encycl. 1:43. 1783. Scamman(p. 11) says "fertile ones [pinnules]... acute or acuminate..." but fig. 8 does not bear this out.

British Honduras (GH, US), Guatemala (GH, US), Honduras (GH, US), Costa Rica (FLAS, GH, US), Panama (GH, US), Jamaica (FLAS), W. I. (FLAS).

Nicaragua, Boca Machado, vallee du San Juan, 20 m alt., H. Pittier 9632 (US).

A lo largo del Rio Grande, Dept. Zelaya, Molina 2111 (US).

Santo Domingo, Dept. Chontales, Bunting & Licht 1160 (GH).

15. A. lucidum (Cav.) Sw., Syn. Fil. 121. 1806.

Panama (GH, US, FLAS), Trinidad (FLAS).

Nicaragua, Chontales, Fournier; Hemsley.

16. A. lunulatum (Roxb.) Burm. f., Fl. Ind. 235. 1768.

This is the name which Morton has adopted for the species which has been called "A. philippense". He considers the latter to be unidentifiable. Contr. U. S. Nat. Herb. 38:371. 1974
Guatemala (GH, US), Honduras (GH, US), Salvador (US), Costa Rica (GH, US), Panama (GH, US).

Nicaragua, Ocotal, Dept. Nueva Segovia, Atwood 755 (VT);

Nichols 816 (SEY, SMU, GH, F, MO); Seymour 841 (UC, NY, WDP, GH, WIS).

Amega, Dept. Chinandega, MHV 7204 (GH, US).

No definite locality, Garnier 1027 (GH), 1932 (GH), 1933 (GH).

Managua, Chaves 19 (A); 20 (US).

Masaya, Santiago Volcano, 300-400 m, Maxon 7709 (US);

250 m, Hitchcock s. n. (US); Laguna de Masaya, 300 m

Maxon 7747 (US); Nichols 106 (ENAG, SEY, SMU, F, MC

UC, NY, GH).

Granada, Hemsley, as A. dolobriforme Hk.; Fournier.

La Virgen, Dept. Rivas, Narvaez 1209a (V T).

17. A. macrophyllum Sw., Nov. Gen. Sp. Prod. 135. 1788.

British Honduras (GH, US), Guatemala (GH), Honduras (US), Salvador (GH, US), Costa Rica (FLAS, GH, US, USF), Panama (GH, US), Jamaica (FLAS), Colombia (FLAS).

- Nicaragua, Sierras de Managua, alt. 800 m, Grant 1034 (GH, US); Garnier A1230 (GH), A1231 (GH), 1483 (GH).
 Mombacho, 750-900 m, MHV 7810 (GH, US).
 6-10 km NE of Matagalpa, 1000 m, WMW 23828 (US).
 Chontales, Fournier; Hemsley.
 Castillo, Shimek; La Juana Rio, Shimek.
 A lo largo del Rio Grande, Dept. Zelaya, alt. 0.15 m, Molina 2403 (US).
18. A. obliquum Willd., Sp. Pl. 5:429. 1810; non Kaulfuss, Enum. 200. 1810. British Honduras (GH, US), Guatemala (GH, US), Honduras (US), Costa Rica (GH, US), Panama (GH, US).
 Nicaragua, A lo largo del Rio Grande, Dept. Zelaya, Molina 2453 (GH, US).
 Bluefields, Dept. Zelaya, 0.30 m, Molina 1948 (US).
 Castillo, La Juana Rio, Shimek.
19. A. patens Willd., Sp. Pl. 5:439. 1810.
 Type: Venezuela, Caracas, Bredemeyer (Herb. Willd. 20078) (B); photo (GH).
 Guatemala (GH, US), Honduras (GH), Salvador (US), Costa Rica (GH, US).
20. A. pectinatum Kunze ex Ettingsh. Farnkr. 85, t. 45, figs. 14-16. 1865. See Copeland, Tropical American Ferns 303. 1941. Costa Rica (GH, US).
21. A. petiolatum Desv., Berl. Mag. 5:326. 1811.
 A. Kaulfussii Kunze, Linnaea 21:221. 1848.
 British Honduras (US), Guatemala (US), Honduras (US), Costa Rica (FLAS, US), Panama (US), Jamaica (FLAS).
 Nicaragua, Mosquito Coast, Schramm (US).
 Braggman's Bluff, Dept. Zelaya, Englesing (US).
 Bluefields, Dept. Zelaya, Danneberger (US). [(GH).
 Rama, Dept. Zelaya, Nichols 301 (ENAG, SMU, GH, F, MO).
22. A. Poiretii Wikstr., Vet. Akad. Hdl. 1825. 443. 1826.
 Mexico (FLAS), Guatemala (FLAS, GH, US), Salvador (US), Costa Rica (FLAS, US), Panama (US).
23. A. princeps Moore, Gard. Chr. n. s. 4:197, f. 43-44. 1875. This is the correct name for what has been called A. trapezoides but not for type of A. trapezoides Fee. A. subtrapezoideum Christ, Bull. Boiss. II, 4:1094. 1904. A. trapezoides of recent authors, non Fée.
 Guatemala (US), Honduras (US), Salvador (US), Costa Rica (US), Panama (US), Colombia.
 Nicaragua, Chinandega, Dept. Chinandega, Baker 2190 (GH, US), Ometepe, Smith 2129 (GH); Garnier 1425 (GH).
 Laguna de Masaya, Maxon 7721 (US).
 Santiago Volcano, Dept. Masaya, Maxon 7708 (US).
 Scales of rootstock uniformly light-brown. Cp. A. tenerum.

24. A. pulverulentum L., Sp. Pl. 2:1096. 1753.
British Honduras (US), Guatemala (FLAS, US), Honduras (US),
Costa Rica (FLAS, US), Panama (US), Cuba (FLAS), Jamaica
(FLAS).
Nicaragua, Waspan, Comarca del Cabo, Atwood 3545 (ENAG,
SEY, SMU, GH); Seymour 3566 (SEY).
Cororia Bush, Comarco del Cabo, Seymour 3749 (VT).
Madregara, Dept. Zelaya, Atwood 3212 (SEY, SMU).
Chontales, Fournier.
Mombacho, Dept. Granada, Baker 2541 (GH, US); Garnier
5038 (GH).
Castillo, Dept. Rio San Juan, Shimek.
25. A. Raddianum Presl, Tent. Pterid. 158. 1836.
Mexico to South America. Costa Rica (GH, US), W. I., Old
World. A. cuneatum Langsd. & Fisch., Ic. Fil. 23, t. 26. 1810;
non Forst., 1786. A. Werckleanum Christ, Bull. Boiss. II, 4:
1093. 1904.
Nicaragua, Masaya, Nichols 105 (ENAG, SEY, GH, MO, UC, NY,
WDP).
26. A. Seemannii Hk., Sp. Fil. 2:5, t. 81A. 1851; non A.
platyphyllum Sw., Vet. Akad. Hdl. 74, t. 3, f. 6. 1817.
Guatemala (US), Honduras (US), Costa Rica (FLAS, US), Costa
Rica (USF), Panama (US).
27. A. serrato-dentatum Willd., Sp. Pl. 5:445. 1810.
British Honduras (US), Guatemala (US), Costa Rica (FLAS, US),
Panama (US).
28. A. tenerum Sw., Nov. Gen. Sp. Prod. 135. 1788.
A. trapezoides Fée, Gen. Fil. 117. 1852; non recent authors.
Scales of rootstock darker-brown in center in contrast to A.
princeps, q. v.
Florida (FLAS), Mexico, British Honduras (US), Honduras (US),
Costa Rica (US), W. I. (FLAS).
Nicaragua, Granada, Hemsley; Fournier.
Ometepe, Dept. Rivas, Shimek.
29. A. terminatum Kunze, Miq. Diar. Inst. Reg. Bat. 3.
1843. As descriptions and specimens of this species are rare,
a description is included here, taken from a specimen coll. J.
Cuatrecasas 7551, Colombia, Rio Guayabero, selva 240 m alt.,
Comisaria del Vaupes, Aug. 11, 1939, loaned from the U. S.
National Herbarium by the kindness of Dr. D. B. Lellinger.
Rootstock creeping, nodose. Stipe 36 cm long, with scattered
irregular hairs. Frond bipinnate. Segments with few long hairs
beneath, otherwise glabrous, the longest 3.5-4.5 mm wide,
10-14 mm long. Main axis and axes of segments with sparse
long spreading hairs. Terminal segment 5-13 mm long, 1.5-4
mm wide, nearest segments 4-5 mm long. Sori several, 0.75-

1.5 mm long, on upper and outer margins of segments.

British Honduras, Guatemala (US), S. A. (GH).

Nicaragua, Bluefields, Dept. Zelaya, Molina 2020 (US).

30. A. tetraphyllum H. & B. in Willd., Sp. Pl. 5:441. 1810.
Type: Cuba, Poeppig; isotype (B, US, L). Syntypes: Herb. Willd.
20082-1, ex Vahl and -2, Caripe, Humboldt & Bonpland (B);
photos (GH).

British Honduras (US), Guatemala (US), Honduras (US), Salva-
dor (GH), Costa Rica (US), Panama (US), W. I., S. A.

Nicaragua, Road to Tuma, Dept. Matagalpa, 1000 m, WMW
23834 (US).

Chontales, Hemsley.

Castillo, Dept. Rio San Juan, Shimek.

Sierra de Managua, 800 m, Garnier 736 (US).

31. A. trapeziforme L., Sp. pl. 2:1097. 1753.

British Honduras (US), Guatemala (US), Honduras (US), Salva-
dor (US), Costa Rica (US), Jamaica (FLAS).

Nicaragua, without definite locality, Wright (GH).

E of Jinotega, 3200 ft., Howard 98 (US), 101 (US).

NE of Matagalpa, along Rio Malacal, 350 m, WMW 23972
(US).

5 km N of Matagalpa, 1000 m, WMW 23732 (US).

A lo largo del Rio Grande, 0-15 m, Molina 2404 (US).

Jinotepe, Dept. Carazo, 500 m, Hitchcock, s.n. (US);

about 600 m, Standley 8466 (GH); Garnier 5041 (GH).

Las Nubes, S of Managua, 800-900 m, MHV 7517 (US).

Las Nubes, Sierra de Managua, Dept. Masaya (sic), Stan-
dley & Garnier 8060 (US).

Laguna de Masaya, 300 m, Maxon 7722 (US).

Granada, MHV 7595 (US); Fournier; Hemsley.

Sierra de Managua, 600-900 m, Garnier 480 (GH); Grant
1033 (GH).

Mombacho, Dept. Granada, Grant 780 (GH).

Ometepe, Dept. Rivas, Wright (GH, US); Smith 2134 (GH).

32. A. villosum L., Syst. Nat. ed. 10, 2:1328. 1759.

Type: Linn 1252, 10. photo A. A. acuminatum Desv., 1811.

British Honduras (US), Guatemala (US), Salvador (US), Costa
Rica (US), Panama (US), W. I., (FLAS), Colombia (FLAS).

Nicaragua, Chichigalpa, Dept. Chinandega, Standley 11312 (US),
Chinandega, Dept. Chinandega, Baker 2134 (GH).

Boaco, Nichols 1464 (ENAG, SEY, SMU, GH, F, UC, NY).

Chontales, Hemsley.

Chontales, as A. acuminatum Fournier.

Sierras de Managua, Chaves 2 (GH); 27 (US).

Granada, Fournier.

Ometepe, Dept. Rivas, Smith 2128 (GH, US); Garnier 1828
(GH), 465 (GH).

Without definite locality, Wright (GH, US).

Ometepe, Dept. Rivas, Smith 2128 (GH, US);

Garnier 1828 (GH), 465 (GH).

Without definite locality, Wright (GH, US).

33. A. Wilesianum Hk., Sp. 2:50, t. 83C. 1851.

A. crenatum Baker, Syn. 120. 1867.

British Honduras (US), Guatemala (US), Honduras (US).

34. A. Wilsonii Hk., Sp. 2:6, t. 72A. 1851.

A. dolosum Kunze, Linnaea 21:219. 1848. var. (Ind. Fil. 26).

British Honduras (US), Guatemala (US), Costa Rica (US), Panama (US).

Nicaragua, S of Hunawas, alt. 220 ft., Engelsing 59 (US).

Sangsangta, Segovia District, Schramm 8 (US).

EXCLUDED AND DOUBTFUL SPECIES

A. Alarconianum Gaud., Voy. Bonitz Bot. t. 99. 1846.

In Ind. Fil. 23, range given as "Mexico--Ecuador" which might imply its occurrence in Central America. No other evidence found of its being there.

A. cristatum L., Syst. Nat. ed. 10, 2:1328. 1759. Reported in Nicaragua by Fournier, Hemsley and Shimek. No recent confirmation found. Probably mistaken identity.

A. decorum Moore, Gard. Chr. 582. 1869. A. Wagneri Bak Baker, Syn. 473. 1874; non Mett. See Ind. Fil. Corrig. 1:90 and Corrig. 2:43; range given as "Costa Rica--Bolivia." No specimen seen from Central America.

A. dolosum Kunze, Linnaea 21:219. 1848. Only A. Wilsonii which is sometimes treated as a var. of this species proves to be in Central America.

A. excisum Kunze, Linnaea 9:82. 1834. Reported in Mexico, Panama, Chile. Occurrence in Panama not confirmed.

A. falcinellum Desv., Berl. Mag. 5:326. 1811. Reported with doubt by Ind. Fil. 26 as growing in "Amer. trop." Occurrence in Central America not confirmed.

A. heteroclitum Christ, Bull. Boiss. II, 4:1094. 1904. Reported by Ind, Fil. 27 as in Costa Rica. Not confirmed.

A. Phyllitidis J. Smith, Lond. Journ. Bot. 1:197. 1842. Occurrence in Central America not confirmed.

A. philippense L. See discussion under A. lunulatum, p. 9.

A. platyphyllum Sw., Vet. Akad. Hdl. 74, t. 3, f. 6. 1817; non Kunze; non A. Seemannii Hk. which has been mistaken for a synonym. See Scamman p. 8. Reported in Central America in Ind. Fil. 31. Probably A. Seemannii, mistaken for A. platyphyllum.

A. stellatum Warsz., Salom, Nom. 22. 1883. Reported by Ind. Fil. 33 as occurring in Guatemala. Occurrence there not confirmed.

A. tinctum Moore, Gard. Chr. 932. 1862. Listed in Ind. Fil. 34 with A. decorum Moore and A. Wagneri Mett. as synonyms. In Corrig. 1:90, stated not to be synonyms. Reported as occurring in Central America. No specimen found from Central America.

A. tricholepis Fee, Mem. Foug. 8:72. 1857. Report of occurrence in Guatemala probably an error. Ind. Fil. does not report it in Central America.

A. triquetrum Presl, Ettingsh. Farnkr. 81, t.42, f. 9, 10. 1865. Treated with doubt in Ind. Fil. 35 as in "Amer. trop." no further evidence of occurrence in Central America.

A. villosissimum Mett., in Kuhn, Linnaea 36:73. 1869. Report in Ind. Fil. 35 of occurrence in Panama not confirmed.

Abbreviations.

AMN, Atwood, J. T., Jr., & S. A. Marshall & D. A. Neill.

ENAG, Herbarium of the Escuela Nacional de Agricultura y Ganaderia, Managua, Nicaragua.

H. & B., Humboldt & Bonpland

MVH, Maxon, W. R. & A. T. Valentine & A. D. Harvey.

S. A., South America.

SEY, Herbarium of Frank C. Seymour.

W. I., West Indies.

WDP, Herbarium of St. Norbert College, West De Pere, Wis.

WMW, Williams, L. O. & Antonio Molina R. & Terua P.

Williams.

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